

THE JOURNAL OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

(Including Transactions)

Volume 36

SEPTEMBER 1914

Number 9

CONTENTS

SOCIETY AFFAIRS

The Annual Meeting (III). The Public Hearing of the Boiler Specifications Committee (IV). Meetings in Buffalo (V). Amendment to the Constitution (V). Applications for Membership (V).

TRANSACTIONS SECTION

PAGE

Power Development at the High Dam between Minneapolis and St. Paul, Adolph F. Meyer.....	305
Industrial Service Work in Engineering Schools, Joseph W. Roe.....	316
Gear Testing Machine, Wilfred Lewis.....	323
A Flow Metering Apparatus, A. M. Levin....	326
Railroad Track Scale, W. Wallace Boyd.....	329
Necrology.....	336

REVIEW SECTION

Foreign Review and Review of the Proceedings of Engineering Societies.....	0173
-------------------------------------------------------------------------------	------

SOCIETY AND LIBRARY AFFAIRS

Personals.....	LI
Employment Bulletin.....	LI
Accessions to the Library.....	LIII
Officers and Committees.....	LIV

PUBLISHED MONTHLY BY

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

29 West Thirty-ninth Street, New York

PRICE 35 CENTS A COPY, \$3.00 A YEAR; TO MEMBERS AND AFFILIATES, 25 CENTS A COPY, \$2.00 A YEAR. POSTAGE TO
CANADA, 50 CENTS ADDITIONAL; TO FOREIGN COUNTRIES, \$1.00 ADDITIONAL

C 55. The Society as a body is not responsible for the statements of facts or opinions advanced in papers or discussions.

Entered as second-class matter, January 4, 1912, at the Postoffice, New York, N. Y., under the act of March 3, 187

COMING MEETINGS OF THE SOCIETY

September 8, San Francisco, Cal. Subject: Hydroelectric Power Development in Conjunction with that of Domestic Water Supply.

September, St. Paul, Minn. Subject: Power Development on Mississippi River between St. Paul and Minneapolis. (Date of meeting will be furnished upon application to Secy. E. J. Heinen, 708 Commerce Bldg., St. Paul).

October 8, Philadelphia Pa. Joint meeting with the Franklin Institute. Paper on Cast Iron, by J. F. Johnson.

October 22, Buffalo, N. Y. Address by Charles Whiting Baker on a question of Public Service.

November 18, New Haven, Conn. Fall meeting with afternoon and evening sessions, Mason Laboratory of Mechanical Engineering, Sheffield Scientific School, Yale University. Subject: The Generation and Application of Electricity in Manufacturing.

Annual Meeting, December 1-4, New York City. There will be a session on Engineering Metals, particularly Steels of Construction and for Tools; Cast Irons; and Alloys of Copper, Tin and Aluminum, etc.; and the entire day on Thursday, December 3, will be devoted to the general subject of the Engineering in connection with the Administration of a City; the session will be opened by the Mayor of the City of New York. The sub-committees on Railroads, Machine Shop Practice, and Textiles are arranging for sessions, and there will undoubtedly be groups of papers given under the direction of other committees, besides one session at which several important miscellaneous papers will be read.

THE JOURNAL OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

(Including Transactions)

Volume 36

September 1914

Number 9

THE ANNUAL MEETING

DECEMBER 1-4, 1914

Because of the many new developments in the field of Engineering Metals and their application to methods of manufacture, it has been decided to devote a session of the Annual Meeting of the Society, to be held in New York, December 1-4, to this important subject. Steels of construction and for tools, cast irons, and alloys of copper, tin and aluminum, etc., will be among the phases to be touched upon. The intention of the Committee in planning this session is to bring out and to make a matter of common knowledge the advances in this field up to the present time. The Sub-Committee on Iron and Steel will have charge of the session and it is the expectation that four papers will be presented.

In line with the widespread movement among engineers the world over to devote their knowledge to the solution of public problems, the Committee on Public Relations, having charge of the Society's activities in this direction, will provide an all-day meeting on Thursday, December 3, on the subject of Public Service. Papers on municipal engineering and related matters will be presented. The session will be opened by John Purroy Mitchel, Mayor of the City of New York, and the following papers will be given during the day:

SNOW REMOVAL, a Report of the Committee on Resolutions of the Snow Removal Conference held in Philadelphia, April 16-17, 1914.

UTILIZATION OF MUNICIPAL WASTES, by Irwin S. Osborne, designer and operator of the Columbus, O., Garbage Disposal Plant, and consulting engineer of the cities of Philadelphia, New York, Washington, D. C., and Toronto, Canada.

THE TRAINING OF MUNICIPAL EMPLOYEES, by H. M. Waite, City Manager, Dayton, O.

THE CLEANING OF PUBLIC BUILDINGS, by Wm. H. Ball, Chief, Bureau of City Property, Philadelphia.

THE FUTURE OF THE POLICE ARM, by Henry Bruère,

City Chamberlain, New York City, and Director of the National Bureau of Municipal Research.

CONTROLLING FACTORS IN MUNICIPAL ENGINEERING, by Morris L. Cooke, Director, Dept. of Public Works, Philadelphia.

A STUDY OF CLEANING FILTER SANDS, by Sanford E. Thompson, Consulting Engineer, Newton Highlands, Mass.

MUNICIPAL COLLEGES IN GERMANY, by Clyde L. King, Instructor in Political Science, University of Pennsylvania, Philadelphia.

THE DESIGN AND OPERATION OF THE CLEVELAND MUNICIPAL ELECTRIC LIGHT PLANT, Frederick W. Ballard, Commissioner of Lighting, Dept. of Public Utilities, Cleveland, Ohio.

In addition, the Committee will be glad to receive short memoranda, covering not more than two pages, outlining any recent changes in the conduct of different kinds of municipal work which tend to put it upon an engineering basis, and which may have come under the observation of our members.

The sub-committees of the Committee on Meetings will again contribute sessions on their special subjects to the meeting. Three papers will probably be presented at a session on Machine Shop Practice, a report on The Steam Locomotive of Today is to be given by the sub-committee on Railroads, and there will be a Textile Session, with two or three papers. Besides these and others yet to be arranged for, there will be one or two miscellaneous sessions, depending upon the amount of time available. Among the papers already selected is one upon the Operation of Grinding Wheels in Machine Grinding, by George I. Alden, and another on a Rate Flow Meter, by Prof. H. C. Hayes.

Plans are already under way, in charge of the New York Local Committee, for the social features of the meeting, which always constitute so important a part of the conventions of the Society.

THE PUBLIC HEARING OF THE BOILER SPECIFICATIONS COMMITTEE

September 15, 1914, in the Rooms of the Society

The work of the Boiler Specifications Committee marks one of the most important undertakings of The American Society of Mechanical Engineers.

During the past few years the introduction of boiler inspection laws in various states and cities has aroused the necessity for the establishment of uniform requirements and the efforts of the Committee in this direction have been generally favored and supported. It has been found that the most important interests are in favor of the best material and construction known, and the letters that have been received particularly from those abroad quite generally indorse the position that has been taken by the Committee.

The basic idea of the Committee's work is the formulation of a standard of the highest requirements, thereby reducing the great loss of life and property in the United States from boiler explosions and derangements, which are for the most part preventable. It is the intention also to create a standard which, it is hoped, will ultimately be adopted by the Federal Government and state governments not now having boiler regulations, and, through uniform legislation, to produce such a condition of affairs that a boiler built for any one state will be acceptable in any other.

Where state legislation has been enacted, it is hoped that it will be modified to conform to the Society's model.

As announced in the August number of The Journal, the preliminary work of the Committee to Formulate Standard Specifications for the Construction of Steam Boilers and Other Pressure Vessels and for the Care of Same in Service, which was completed last February and placed in the form of a tentative report of limited edition for critical study and improvement, is now to be submitted to public hearing for further suggestions and improvement. The tentative draft was issued in an edition of 1500 for a preliminary study and was submitted to recognized authorities throughout the civilized world, including non-members of the Society as well as members; it was sent to boiler manufacturers, prominent steel manufacturers, insurance companies, boiler users, consulting engineers, operating engineers, and all who are known to have special knowledge of the boiler business. With each copy was sent a request that the recipient should take out whatever was considered inadvisable and add whatever would further safeguard human life and property.

At the St. Paul-Minneapolis meeting much interest was shown in the work of the Committee. This was not considered as a report, but a topical discussion of some of the more important phases of steam boiler legislation was held and many of the points in boiler practice on which there was a difference of opinion were considered. There had been a conference at Chicago on

Monday, June 15, among representatives of the Committee, the Association of Steel Manufacturers, and the National Tubular Boiler Manufacturers Association, at which the discussion was devoted largely to the steel specifications desired. This discussion was continued at the opening session of the Spring Meeting on Wednesday morning, June 17, and was transferred later to a separate meeting room where it was continued the greater part of the day. The Committee has sought in every way to secure the fullest expression of opinion. The necessity for a careful study of the more important factors involved was emphasized by the Committee, and the result of the discussion was a resolution calling for a public hearing in New York in September, as follows:

Resolved, that on September 15, 1914, the Committee hold in the rooms of The American Society of Mechanical Engineers, 29 West 39th Street, New York, N. Y., a hearing of all interests concerned on the preliminary report of the Committee appointed to Formulate Standard Specifications for the Construction of Steam Boilers and Other Pressure Vessels and for the Care of Same in Service, and that those desiring to participate in the discussion present their criticisms and suggestions in writing prior to August 15th.

Resolved, that in addition to invitations, notification by publication in the technical press be given to the hearing.

Carrying out the policy of the Committee and the Society in all of its determinations, invitations have been sent out to the following associations and engineering organizations known to be interested in the matter of standard boiler specifications:

AMERICAN BOILER MANUFACTURERS ASSOCIATION
AMERICAN INSTITUTE OF STEAM BOILER INSPECTORS
AMERICAN RAILWAY MASTER MECHANICS ASSOCIATION
AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS
AMERICAN SOCIETY OF TESTING MATERIALS
ASSOCIATION OF AMERICAN STEEL MANUFACTURERS
CITY OF CHICAGO, DEPARTMENT OF BOILER INSPECTION
CITY OF DETROIT, OFFICE OF CHIEF BOILER INSPECTOR
CITY OF NEW YORK, DEPARTMENT OF BOILER INSPECTION
CITY OF PHILADELPHIA, DEPARTMENT OF BOILER INSPECTION
COMMITTEE ON RELATION OF RAILWAY OPERATION TO LEGISLATION
INDIANA STATE BUREAU OF BOILER INSPECTION
INDUSTRIAL COMMISSION OF WISCONSIN
INTERSTATE COMMERCE COMMISSION
MARINE ENGINEERS BENEFICIAL ASSOCIATION
MASSACHUSETTS BOARD OF BOILER RULES
MASSACHUSETTS PUBLIC SERVICE COMMISSION
MONTANA STATE BOARD OF BOILER INSPECTION
NATIONAL ASSOCIATION OF BOILER MANUFACTURERS
NATIONAL ASSOCIATION OF COTTON MANUFACTURERS
NATIONAL ASSOCIATION OF STATIONARY ENGINEERS
NATIONAL ASSOCIATION OF THRESHER MANUFACTURERS
NATIONAL BUREAU OF STANDARDS
NATIONAL COUNCIL FOR INDUSTRIAL SAFETY
NATIONAL TUBULAR BOILERMAKERS ASSOCIATION
NEW YORK STATE COMMISSION ON UNIFORM STATE LAWS
OHIO STATE BOARD OF BOILER RULES
PUBLIC SERVICE COMMISSION, 2d DISTRICT, NEW YORK STATE
STATE OF ILLINOIS
STATE OF MARYLAND
STATE OF NEW YORK
STATE OF NORTH CAROLINA
STATE OF PENNSYLVANIA, DEPARTMENT OF LABOR AND INDUSTRY
STATE OF VIRGINIA

U. S. BOARD OF SUPERVISING INSPECTORS OF STEAM VESSELS
U. S. BUREAU OF STEAM ENGINEERING
U. S. DEPARTMENT OF COMMERCE

Any one reading this notice and observing any omissions will confer a favor both by notifying the organization of the hearing and the Society, so that an official invitation may be sent. Most of the organizations named have accepted the invitation.

These organizations were invited to be present or to have representation at the hearing which will be held in the rooms of the Society in New York, at 10 a.m., Tuesday, September 15; and all who had not already done so were asked wherever possible to prepare and send a statement in writing previous to the hearing, to assist in the deliberations. A limited number of copies of the draft report are still available and may be secured on application.

The foundation of these rules is the Boiler Law of Massachusetts, which has been enforced for some time and which has recently been adopted by the State of Ohio, the City of Detroit, and the City of Manila in the Philippine Islands. Several of the other states are now considering the adoption of standard rules regulating boilers and other pressure vessels. In the six years that the Massachusetts Rules have been in force, over 8300 boilers have been constructed to that standard and boiler explosions and derangements have been reduced to a minimum.

Much credit is due to the Committee for its tireless efforts in preparing the tentative report and in collating the enormous amount of data embodied in the voluminous recommendations on which the tentative draft was based. The work has involved much self-sacrifice on the part of the members, particularly Mr. John A. Stevens, Chairman, whose extensive experience as a member of the Board of Boiler Rules of the State of Massachusetts, in developing and inaugurating the Massachusetts Standard, has been turned to advantage in the work here undertaken. The other members of the Committee to whom much credit is also given are W. H. Boehm, R. C. Carpenter, Richard Hammond, C. L. Huston, E. D. Meier and E. F. Miller. This work, which is borne exclusively by the Committee members and by The American Society of Mechanical Engineers is for the benefit of the people through the protection of life and property and of the boiler industry at large. It is national in character and its effect will be felt not only by the manufacturing interests in easier conditions for selling, but also will be of similar benefit to the users as it will enable them to secure boilers more promptly and at less cost for a safe boiler.

The Society is rendering a peculiar service in its several activities and is endeavoring to reach the needs of its members both collectively and individually, and the work of such a committee as the Boiler Specifications Committee should have the cooperation and interest of the profession at large.

MEETINGS IN BUFFALO

Among the most successful of the recent organizations of engineers in local centers has been that in Buffalo, and from plans already made for the coming season there is every promise of a decidedly interesting series of meetings in store for the members.

As now planned, there are to be fourteen meetings, commencing October 22 and ending May 6. The program is not entirely completed, but so far tentative arrangements have been made for eleven of these meetings. These will include addresses as follows: by Charles Whiting Baker on a Public Service subject; Industrial Ventilating Equipment, by J. Irvine Lyle; Use of Cast Iron in Reinforced Concrete, by A. G. Hillberg; Heating and Ventilating of Street Cars or Air Conditioning with respect to Humidity Control and Removal of Dust in Industrial Plants, by Prof. R. C. Carpenter; Interesting Features of Construction involved in the Design of the Conners Creek Plant of the Edison Illuminating Company, by C. F. Hirschfeld; Recent Developments in Steam Turbine Engineering, by Prof. J. A. Moyer; Recent Progress in Bridge Design and Construction, by Prof. Henry R. Jacoby; Machine Design and Construction, by Prof. Dexter S. Kimball, etc.

AMENDMENT TO THE CONSTITUTION

The following amendment to the Constitution is to be presented at the Annual Meeting, December 1914:

C 45 The Standing Committees of the Society to be appointed by the President shall be:

- Finance Committee
- Committee on Meetings
- Publication Committee
- Membership Committee
- Library Committee
- House Committee
- Research Committee
- Public Relations Committee
- Committee on Constitution and By-Laws
- Committee on Standardization

The Committee on Standardization which it is thus proposed to add to the Standing Committees of the Society will act as a clearing house for all questions of standardization which come before the Society.

APPLICATIONS FOR MEMBERSHIP

Members are requested to scrutinize with the utmost care the following list of candidates who have filed applications for membership in the Society. These are sub-divided according to the grades for which their age would qualify them and not with regard to professional qualifications, i. e., the age of those under the first heading would place them under either Member, Associate or Associate-Member, those in the next class under Associate-Member or Junior, while those in the third class are qualified for Junior grade only. The Membership Committee, and in turn the Council, urge the members to assume their share of the responsibility

of receiving these candidates into the Membership by advising the Secretary promptly of anyone whose eligibility for membership is in any way questioned. Members will be furnished with complete records of any candidate thus questioned. All correspondence in regard to such matters is strictly confidential and is solely for the good of the Society, which it is the duty of every member to promote. These candidates will be balloted upon by the Council unless objection is received before October 10, 1914.

NEW APPLICATIONS

FOR CONSIDERATION AS MEMBER, ASSOCIATE OR ASSOCIATE-MEMBER

BARNUM, THEODORE P., Secy., Barnum Brothers Co., Troy, N. Y.
 BEENER, FRANKLIN, Draftsman in Charge, Bethlehem Steel Co., South Bethlehem, Pa.
 BENDA, HARRY R., Mech. Engr., D. Auerbach & Sons, New York.
 BIRCH, G. BIRGER, Secretary, Cameron Machine Co., Brooklyn, N. Y.
 CAUGHELL, JEWEL N., Ch. Engr., Dodge Bros., Detroit, Mich.
 CORBETT, ELLSWORTH A., Engr., Power House Equipment, American Mechanic Bldg., Trenton, N. J.
 DANIEL, ALLAN P., Ch. Designing Mech. Engr., Bituminized Road Co., Kansas City, Mo.
 DEINERT, EDMUND F., Ch. Engr. of Pumping Plants, Hawaiian Commercial & Sugar Co., Puunene, Maui, T. H.
 GIBBONS, JAMES O. G., Asst. in Engrg. Dept., The New York Edison Co., New York.
 JONES, IRLEY E., Secy. & Genl. Mgr., The Brownell Co., Dayton, Ohio.
 KERR, ROBERT C., Draftsman and Designer, Sargent & Lundy, Chicago, Ill.
 KNOEPEL, CHARLES E., Cons. Engr., 15 Dean St., Worcester, Mass.
 LANDGRAF, FREDERICK K., Genl. Supt., Flannery Bolt Co., Pittsburgh, Pa.
 LEVERTON, ERNEST R., Contractor & Mgr. of Elevator Co., Calgary, Canada.
 MCKIBBIN, FREDERICK W. J., President, Tompkins Bros. Co., Troy, N. Y.
 MACMARTIN, JAMES MACGREGOR, Ch. Engr., The Delaware & Hudson Co., Albany, N. Y.
 MORLAN, WILBERT, Engr., Pumping Station, Queens County Water Co., Far Rockaway, N. Y.
 MORRISON, WILLIAM S., Ch. Mech. Draftsman, N. Y. Edison Co., New York.
 MOULTON, SETH AUGUSTINE, Partner, Sawyer & Moulton, Cons. Engrs., Portland, Me.
 NAKAI, KUMATARO, Engr., Ashio Copper Mines, The Furukawa & Co., Ashio, Shimotsuke, Japan.
 PARKE, PETER, Ch. Engr., The Pullman Co., Chicago, Ill.
 PATRICK, I., Ch. Engr., Consolidated Press & Tool Co., Hastings, Mich.
 RENWICK, EDWARD B., Real Estate & Corporation Management, Pirsson & Renwick, New York.
 ROYER, THOMAS J., Asst. Supt., Generation & Transmission, Pacific Lt. & Pwr. Corp., Los Angeles, Cal.
 SCHMIDT, ARTHUR A., Mech. Engr., Western Precipitation Co., Los Angeles, Cal.
 TIETZE, WILLIAM, Ch. Engr. of Power Plants, Pierce Phosphate Co., Pierce, Fla.
 TURNER, FRANK C., Representative, Southern Wheel Co., Birmingham, Ala.

TYSON, ROBERT E., Pres., Tyson Bros., Inc., Carteret, N. J.
 WOLFE, HENRY G., Asst. Leading Mech. Draftsman, N. Y. Edison Co., New York.

WOOD, DENNISTOWN, Asst. Mech. Engr. & Engr. of Tests, Southern Pacific Co., San Francisco, Cal.

FOR CONSIDERATION AS ASSOCIATE-MEMBER OR JUNIOR

BARUCH, MILTON, Mech. Engr., Llewellyn Iron Wks., Los Angeles, Cal.
 BASS, WILLARD J., Erecting Engr., Armour & Co., Chicago, Ill.
 BLAKESLEE, DORAF W., Designer, Engrg. Dept., Mathews Gravity Carrier Co., Ellwood City, Pa.
 BUCK, TURNEY E., Tool Designer, Sangamo Electric Co., Springfield, Ill.
 COLLINS, RICHARD C., Mech. Engr., United Shoe Mch. Co., Beverly, Mass.
 CRAGG, WALSTON S., Asst. Mech. Engr., Hollinger Gold Mines, Ltd., Timmins, Ont., Canada.
 DANIELS, GEORGE C., Supt. Pwr. Plant, Central Ill. Lt. Co., Peoria, Ill.
 DELEMONS, SIDNEY P., Mech. Engr., Bureau of Public Bldgs. & Offices, Borough of Manhattan, New York.
 FISCHER, CHARLES L., Motive Power Inspr., Pennsylvania Lines West of Pittsburgh, Pittsburgh, Pa.
 PARSONS, FREDERICK A., Mch. Draftsman, Cincinnati Milling Mch. Co., Cincinnati, Ohio.
 WILLIAMS, IRA L., Avon, Minn.
 WORBOIS, HOMER L., Gas Engr., Bullock Tractor Co., Chicago, Ill.

FOR CONSIDERATION AS JUNIOR

ALDEN, JOHN L., Representative, Oneida Steel Pulley Co., Oneida, N. Y.
 ANDERSON, ROBERT E., Junior Mech. Engr., U. S. Corps of Engrs., Cincinnati, Ohio.
 BAIRD, JAMES T., JR., 56 Ellsworth Ave., New Haven, Conn.
 FORSYTH, JAMES M., Student Apprentice, Allis-Chalmers Mfg. Co., Prairie Du Sac, Wis.
 HOSMER, FRED E., Asst. Mech. Engr. and Draftsman, Gulf Pipe Line Co., Beaumont, Texas.
 MAINE, HARRY H., 27 Bandman Ave., Jamaica, N. Y.
 MUDGE, STERLING W., Engr., Arbuckle Bros., Brooklyn, N. Y.
 POTTER, MARK H., Ch. Engr., Oxford Motor Cars & Foundries, Ltd., Montreal, Canada.
 RAHNER, MAXWELL L., 306 Grand Bldg., Atlanta, Ga.
 SHAW, JOHN E., with International Steam Pump Co., New Orleans, La.
 SHIRLEY, JOHN G., Student's Course, The Chapman Valve Mfg. Co., Indian Orchard, Mass.
 SIMMONS, HARRY M., 84 North Pearl St., Albany, N. Y.
 STOWELL, HOWARD E., Draftsman, The Carborundum Co., Niagara Falls, N. Y.

APPLICATIONS FOR CHANGE OF GRADING

PROMOTION FROM ASSOCIATE

CROGHAN, JOHN T., Supt. of Constr., Stone & Webster Engrg. Corp., Boston, Mass.

PROMOTION FROM JUNIOR

WEBSTER, LAWRENCE B., Engr. on Valuations, American Gas & Elec. Co., N. Y., and Engr., Committee on Appraisals, Ohio Elec. Lt. Association, Cleveland, Ohio.
 WILDER, SYLVANUS W., Supt., Dolphin Jute Mills, Paterson, N. J.

SUMMARY

New applications.....	55
Applications for change of grading	
Promotion from Junior.....	2
Promotion from Associate.....	1
Total	58